Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

Claims 1-9. (Canceled)

Claim 10. (New) A process for preventing undesired polymerization, comprising:

maintaining an effective concentration of a stabilizer which comprises N-oxyl radicals in a mixture containing ethylenically unsaturated compounds, wherein

(i) an electronic signal which correlates with the concentration of the N-oxyl radicals in the mixture is obtained periodically or continuously,

(ii) the electronic signal is compared with a reference value, and

(iii) addition of a stabilizer to the mixture is controlled according to the comparison (ii).

Claim 11. (New) The process as claimed in claim 10, wherein the electronic signal is obtained by exposing the mixture or a portion thereof to a magnetic field and simultaneously applying an alternating electromagnetic field, the resonance caused by the N-oxyl radicals being detected.

Claim 12. (New) A process for isolating ethylenically unsaturated compounds, comprising:

while distilling a mixture of ethylenically unsaturated compounds, maintaining an effective concentration of a stabilizer in the mixture which comprises free N-oxyl radicals, wherein

(i) an electronic signal which correlates with the concentration of the N-oxylradicals in the mixture is obtained periodically or continuously,

(ii) the electronic signal is compared with a reference value, and

(iii) addition of a stabilizer to the mixture is controlled according to the comparison (ii).

Claim 13. (New) The process as claimed in claim 12, wherein the electronic signal is obtained by exposing the mixture or a portion thereof to a magnetic field and simultaneously applying an alternating electromagnetic field, the resonance caused by the N-oxyl radicals being detected.

Claim 14. (New) The process as claimed in claim 12, wherein the distillation is conducted in a cascade of at least two distillation columns, in which a high boiler fraction containing the stabilizer accumulates in the bottom of at least one distillation column and a stream of a portion of the high boiler fraction is removed and is mixed with a feed that enters an upstream column.

Claim 15. (New) The process as claimed in claim 10, wherein the concentration of the N-oxyl radicals in the mixture ranges from 5 to 150 ppm, based on ethylenically unsaturated compounds.

Claim 16. (New) The process as claimed in claim 10, wherein the stabilizer contains a polymerization retardant.

Claim 17. (New) The process as claimed in claim 16, wherein the polymerization retardant is an aromatic nitro compound.

Claim 18. (New) The process as claimed in claim 10, wherein the ethylenically unsaturated compound is a vinylaromatic compound.

Claim 19. (New) The process as claimed in claim 10, wherein the reference value is dependent on at least one other measured variable which is selected from the group consisting of temperature, redox potential, near infrared transmission or absorption, turbidity, viscosity, density or refractive index of the mixture.

Claim 20. (New) The process as claimed in claim 12, wherein the reference value is dependent on at least one other measured variable which is selected from the group consisting of temperature, redox potential, near infrared transmission or absorption, turbidity, viscosity, density or refractive index of the mixture.

Claim 21. (New) The process as claimed in claim 10, wherein the said N-oxyl radicals are present in the mixture in an amount of at least 0.1 ppm.

Claim 22. (New) The process as claimed in claim 12, wherein the said N-oxyl radicals are present in the mixture in an amount of at least 0.1 ppm.

Claim 23. (New) The process as claimed in claim 10, wherein the ethylenically unsaturated compounds are selected from the group consisting of α,β-ethylenically unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, esters of α,β-ethylenically unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, vinylaromatic compounds, heteroaromatic vinyl compounds, vinyl esters of C_1-C_{18}-monocarboxylic acids or dicarboxylic acids, linear or branched α-olefins or cyclic olefins, acrylonitrile, methacrylonitrile, vinyl and allyl C_1-C_{40}-alkyl ethers, acrylamide, alkyl-substituted acrylamides, vinyl halides, vinylidene halides, polyethylenically unsaturated compounds, sulfo-containing monomers, C_1-C_4-hydroxyalkyl esters of ethylenically unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, vinylphosphonic acid compounds, alkylaminoalkyl (meth)acrylates or alkylaminoalkyl (meth)acrylamides or their quaternization products, allyl esters of C_1-C_{30}-monocarboxylic acids, N-vinyl compounds, diallyldimethylammonium chloride, acrolein, methacrolein, monomers containing 1,3-diketo groups, monomers containing urea groups, silyl-containing monomers and glycidyl-containing monomers.

Claim 24. (New) The process as claimed in claim 12, wherein the ethylenically unsaturated compounds are selected from the group consisting of α,β-ethylenically unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, esters of α,β-ethylenically unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, vinylaromatic compounds, heteroaromatic vinyl compounds, vinyl esters of C_1-C_{18}-monocarboxylic acids or dicarboxylic acids, linear or branched α-olefins or cyclic olefins, acrylonitrile, methacrylonitrile, vinyl and allyl C_1-C_{40}-alkyl ethers, acrylamide, alkyl-substituted acrylamides, vinyl halides, vinylidene halides, polyethylenically unsaturated compounds, sulfo-containing monomers, C_1-C_4-hydroxyalkyl esters of ethylenically

unsaturated C_3-C_6-monocarboxylic acids or C_4-C_6-dicarboxylic acids, vinylphosphonic acid compounds, alkylaminoalkyl (meth)acrylates or alkylaminoalkyl (meth)acrylamides or their quaternization products, allyl esters of C_1-C_{30}-monocarboxylic acids, N-vinyl compounds, diallyldimethylammonium chloride, acrolein, methacrolein, monomers containing 1,3-diketo groups, monomers containing urea groups, silyl-containing monomers and glycidyl-containing monomers.

Claim 25. (New) The process as claimed in claim 10, wherein the stabilizer containing N-oxyl radicals is selected from the group consisting of 1-oxyl-2,2,6,6-tetramethylpiperidine, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-ol, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-one, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl acetate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl 2-ethylhexanoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl stearate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl benzoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl (4-tert-butyl)benzoate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) succinate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) adipate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) sebacate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) n-butylmalonate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) phthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) isophthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) terephthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) hexahydroterephthalate, N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) adipamide, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) caprolactam, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) dodecylsuccinimide, 2,4,6-tris[N-butyl-N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-s-triazine, N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-N.N'-bis-formyl-1,6-diaminohexane, 4,4'-ethylenebis(1-oxyl-2,2,6,6-tetramethylpiperazin-3-one) and tris(2,2,6,6-tetramethyl-1-oxyl-piperidin-4-yl) phosphite.

Claim 26. (New) The process as claimed in claim 12, wherein the stabilizer containing N-oxyl radicals is selected from the group consisting of 1-oxyl-2,2,6,6-tetramethylpiperidine, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-ol, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-one, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl acetate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl 2-ethylhexanoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl stearate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl benzoate, 1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl (4-tert-butyl)benzoate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) succinate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) adipate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) sebacate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) n-butylmalonate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) phthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) isophthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) terephthalate, bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) hexahydroterephthalate, N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) adipamide, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) caprolactam, N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl) dodecylsuccinimide, 2,4,6-tris[N-butyl-N-(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-s-triazine, N,N'-bis(1-oxyl-2,2,6,6-tetramethylpiperidin-4-yl)-N.N'-bis-formyl-1,6-diaminohexane, 4,4'-ethylenebis(1-oxyl-2,2,6,6-tetramethylpiperazin-3-one) and tris(2,2,6,6-tetramethyl-1-oxyl-piperidin-4-yl) phosphite.

Claim 27. (New) The process as claimed in claim 12, wherein the concentration of the N-oxyl radicals in the mixture ranges from 5 to 150 ppm, based on ethylenically unsaturated compounds.

Claim 28. (New) The process as claimed in claim 12, wherein the stabilizer contains a polymerization retardant.

Claim 29. (New) The process as claimed in claim 28, wherein the polymerization retardant is an aromatic nitro compound.

Claim 30. (New) The process as claimed in claim 12, wherein the ethylenically unsaturated compound is a vinylaromatic compound.